Chiropractic management of a patient with postoperative lateral retinacular release using a multimodal approach: a case report

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Abstract

Objective: The purpose of this case report is to describe a chiropractic rehabilitation program for a patient with postsurgical lateral retinaculum release.

Clinical Features: A 26-year-old male ice hockey goalie presented 1 month after having lateral retinaculum release surgery for his left knee with residual mild discomfort and edema in his left knee.

Intervention and Outcome: The patient was treated using a multimodal approach of both passive and active chiropractic care focusing on the restoration of full range of motion, increased proprioception, balance, strength, and endurance to return the patient to competitive ice hockey.

Conclusion: This case study demonstrated that, after 14 weeks of care, the patient was able to return to ice hockey training with no residual symptoms.

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Introduction

Although more work needs to be done to clarify the indications for lateral retinacular release surgery, it is equally important to rehabilitate the injury if the patient decides to have surgery. Merchant and Mercer¹ described the first lateral retinacular release

in 1974 but did not emphasize the importance of history and physical examination findings for the indication for this procedure.

It is our opinion that the entire lower extremity should be taken into account when evaluating and treating the patient. Factors such as core weakness, increased valgus knee alignment, generalized ligamentous laxity, increased foot pronation, and increased femoral anteversion have shown to be factors that can contribute to anterior knee pain and patella instability.² In addition, weakness of the vastus medialis obliquus (VMO) is thought to be an important factor resulting

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in patellar subluxation and dislocation. Understanding the relationship between VMO weakness and patellar tracking may be useful in diagnosis, treatment, and prevention of patellar subluxation.³ The evaluation and treatment of patellar instability continue to evolve. The importance of a thorough physical examination with an accurate diagnosis is essential when the goal is a positive rehabilitative outcome.

Nonoperative treatment with patellar bracing and therapy for primary patellar dislocations is commonly recommended.^{1,4-7} During the acute stage, aspiration of effusion may allow the patient to regain quadriceps strength and control.² However, if a patient has a loose body after a dislocation, Colvin and West⁴ recommend arthroscopy for removal or possible fixation of the fracture fragment, in which case a medial repair will usually be performed simultaneously. Nonoperative treatment includes physical therapy, focusing on strengthening of the gluteal muscles and the VMO, and patellar taping or bracing. It has been reported that up to 55% of patients fail to return to sports activity after a primary patellar dislocation.⁵

There is a growing body of evidence that shows that doctors of chiropractic can successfully manage lower extremity conditions, and there have been reports of successful postsurgical rehabilitation.¹³⁻¹⁶ At present, there are no studies describing chiropractic postsurgical management of lateral release surgery. The purpose of this case study is to describe chiropractic multimodal management for a patient with recent lateral release surgery.

Case report

A 26-year-old male student and ice hockey goalie presented to a chiropractic clinic with a prescription for postoperative rehabilitation for quadriceps and VMO strengthening. He presented 45 days after a lateral release surgery and scope of his left patella-femoral joint due to chronic patellar dislocations. The patient stated that he had a constant dull ache in the left knee rated 1/10 on numeric pain scale while non-weight bearing; but while walking and especially going up stairs or squatting, the pain can increase to 5/10. His lower extremity functional scale form⁶ was scored a 58/80.

On visual inspection, the patient's left knee was moderately swollen especially on the lateral aspect with multiple scars including a 3-in horizontal scar medial to patella and 2 "nick" scars both medial and lateral to patella totaling 5. He displayed a positive J-sign on the

right patella on knee extension, which was not present on the surgically repaired left knee. Palpation revealed a nonpitting edema and a passive range of motion that lacks the last 5° to 10° of knee flexion compared with right knee, but had full range in extension. The patellar grind test reproduced severe pain on the left knee, whereas the right knee was "uncomfortable." Thessaly test at 5° and 20° knee flexion resulted in pain before initiating the twisting motion. Patellar ballotement, anterior drawer, posterior drawer, and valgus and varus stress tests did not reveal ligamentous laxity. McMurray and Appley compression tests did not reproduce or cause pain. The quadriceps, hamstrings, and extensor hallucis tested 5/5 bilaterally for strength, both patellar and Achilles reflexes were 2/5 bilaterally, and gross sensation was intact over the entire lower extremities. On functional examination, a double-leg squat revealed excessive knee loading and a pelvic shift to the right. Single-leg squat was too painful to be performed on the left, whereas right knee showed varus knee loading. Hip abduction test on the left showed posterior pelvic rotation, whereas the right side was normal; and the hip extension test revealed premature erector musculature firing bilaterally. Active straight leg raise displayed a decrease in firing of the left transverse abdominal muscle. While the patient was recovering from postsurgical release of the vastus lateralis muscle, he demonstrated muscular imbalances that led to a decrease in firing of his left transverse abdominal musculature as well as his left gluteus medius muscle, resulting in excessive mechanical knee loading and stress placed upon the patella-femoral joint, causing knee pain.

The initial goals of treatment were to reduce the residual edema from the surgery as well as returning patient to competitive ice hockey. Treatment frequency consisted of 3 times per week for 4 weeks then 2 times per week for the remaining 8 weeks. Passive treatment has included Active release technique (Active Release Techniques, Colorado Springs, CO) to vastus lateralis, iliotibial band, vastus medialis, tensor fascia latae, tibialis anterior, hip adductors, and hamstrings as indicated with 3 to 5 passes each held for 2 seconds at end lengthened position, and Graston (Graston Technique, Indianapolis, IN) to the vastus lateralis and vastus medialis muscle for 2 to 3 minutes total in a lengthened position. The patient also received grade 2 mobilization to the left fibula head in an anterior to posterior motion and grade 3 manipulation to the sacroiliac joints in a posterior to anterior line of drive as indicated. Kinesiotape (Kinesio Holding Corp, Albuquerque, NM) was also applied with one anchor over the greater

Table 1 Rehabilitation protocol^a

Phase 1	
Rocker board	3 sets at 30 s each set
Gluteus bridging	3 sets times 8 reps
Dead bugs	3 sets times 1 min
Terminal knee extensions	3 sets times 8 reps
Scapular triplanes	1 min per plane
1/4 Squats on a vibration plate	3 sets times 30 s at 30 Hz on low settings
Gluteus hip hikes	2 sets times 8 reps bilaterally
Phase 2	
Ball squats	3 sets times 8 reps
Lunges	3 sets times 8 reps bilaterally
Step-downs	2 sets times 10 reps bilaterally
Power-slide	3 sets times 1 min

^a Reps and times were increased incrementally as exercises got easier.

trochanter and the other near the origin of the adductor muscles, each cut into 4 finger strips spread out over the knee, promoting lymph drainage to reduce swelling. Rehabilitation had progressed in the following (Table 1): rocker then wobble boards 3 sets times 30 seconds to 1 minute bilaterally, gluteus bridging 3 sets times 8 reps then advanced to single-leg gluteus bridges, dead bugs with opposite arms/legs 3 sets times 1 minute then advanced to 1/2 foam roll then full foam roll. Exercises are described in Figs 1-7. Also incorporated were terminal knee extensions over a foam roll 3 sets times 8 reps, scapular triplanes at 1 minute each, and 1/4 squats on the vibration plate for 3 sets times 30 seconds at 30 Hz on low settings then advanced to 60 seconds, all of which occurred for the first 2 weeks; treadmill was added at 2 weeks at a comfortable speed for 8 minutes starting

Fig 2. Dead bug (starting position)—Patient lies supine on floor with shoulders flexed straight in the air and both hips and knees flexed to 90° with core musculature braced.

at 2.5 mph and increasing eventually to 5.0 mph, as well as glut hip hikes 2 sets times 8 reps bilaterally. At the 4-week mark, ball squats 3 sets times 8 reps, lunges 3 sets times 8 reps bilaterally, step-downs 2 sets times 10 reps bilaterally, and power-slide (Athletic Innovation Inc, Rochester, NH) 3 sets times 1 minute at an increasing distance as exercise got easier. The patient was trained to do the following at home on a daily basis: glut bridging, dead bugs, terminal knee extensions, and scapular triplane movements. As treatment progressed, exercises were rotated and advanced based on the doctor's expertise in observing functional examination tasks or the exercises. This was done to maximize patient advancement as well as to keep interest in the exercises so that the patient did not get

Fig 1. Glute bridging—Patient lies supine on the floor, braces core musculature, and contracts and lifts glutes off of the ground, placing weight through patient's heels.

Fig 3. Dead bug (movements)—While maintaining core musculature braced, fully flex one shoulder, while simultaneously fully extending the opposite hip and knee, then return to starting position and repeat with the other shoulder and opposite lower extremity.

Fig 4. Terminal knee extension—While supine, contract quadriceps musculature and lift 6 to 8 in off of the ground.

bored due to repetition. The patient was instructed to supplement with glucosamine and chondroitin as per bottle instructions.

Eight weeks after beginning care, the patient was reexamined. At that time, he stated that he no longer had the ache in his left knee and rated pain at all times a 0/10

on the numeric pain scale. His lower extremity functional scale⁶ score was 77/80. Objectively, the patient has no residual edema in his left knee and displays full pain-free active and passive ranges of motion. He had discomfort during the patellar grind test bilaterally, but neither side was worse than the other. Thessaly test performed at 5° knee flexion and 20° knee flexion did not produce pain. On the double-leg squat, the patient showed a slight left pelvis rotation posteriorly. He was able to do the single-leg squat without any pain or discomfort. Results of both the hip abduction and hip extension tests were normal. At this point, the patient elected to start strength training including a full kettle bell workout in an effort to return to competitive ice hockey, which he was permitted to do at the 12-week mark following full-exertion pain-free testing.

Discussion

This case study describes a chiropractic multimodal approach individualized to a patient's surgical

Fig 5. Scapular triplane movements (vertical plane starting [A] and finishing [B] position)—In standing position, while flexed at hips, extend one arm straight backwards. Initiate movement by bringing previously extended arm up into a straight flexed shoulder position or vertical plane while straightening up/extending through the hips.

Fig 6. Scapular triplane movements (horizontal plane starting [A] and finishing [B] positions)—Start in a slight squat position with shoulder extended back with slight trunk rotation. Initiate movement by straightening/standing up through the hips and bringing the extended shoulder across your body in a horizontal plane.

intervention, sport of interest, and functional examination findings. Every visit, treatment was updated and changed to both keep the athlete's interest high as well as provide a challenge.

According to the literature, on average, a full sportive level is expected to be reached at 9.7 months after surgery,⁸ although it has been reported that up to 55% of patients fail to return to sports activity after a primary patellar dislocation.⁹ In a recent study, it has been reported that patients treated nonoperatively after a patellofemoral dislocation have responded well to treatment, specifically a 73% satisfaction rate after nonoperative management.⁸

Maxey and Magnusson⁹ separate rehabilitation postsurgical lateral release into 3 phases: acute, sub-acute, and advanced. The goal of rehabilitation was to prevent loss of muscle strength, endurance, flexibility, and proprioception. During the first 2 weeks post-surgery, the objectives are to decrease pain, manage edema, increase weight-bearing activities, and facilitate quality quadriceps contraction. During weeks 3 to 4, the objectives become to continue management of edema and pain, improve sit-stand transfer activities,

improve strength and stability of the patellofemoral joint, and progress functional training to return activity to previous levels. Once in the advanced phase of rehabilitation during weeks 5 to 6, the goals become for the patient to self-manage edema and pain, perform gait without deviations, and have unlimited ambulation; at this point, closed kinetic chain progression should be made.¹⁰

As commonly found with postsurgical rehabilitation protocols, proprioceptive training^{3,5,9} was used to increase the speed of muscle activation and coordination in the trunk and lower extremities. It is possible to accelerate muscle contraction approximately 2-fold with increased proprioceptive flow through the use of balance exercises.¹⁰ The use of multiplanar exercises is now a contemporary trend in exercise rehabilitation where proprioceptive deficits are known to occur.¹¹ Chiropractic manipulation can alter the mechanics of the hips, spine, and pelvis; and there is also evidence to suggest that sacroiliac joint manipulation may reduce inhibition of the knee extensors muscles.¹² One treatment not explored in this case was the inexpensive elastic patellofemoral sleeve brace. Evidence indicates

Fig 7. Scapular triplane movements (coronal plane starting [A] and finishing [B] positions)—Start with one shoulder in abducted position with hips rocked towards same side, then swing arm down and into adduction while rocking hips to opposite side.

that the clinical improvements seen with bracing in participants with patellofemoral pain do not come from a correction in patellar tracking patterns and alignment, but are the results of other subtle differences in joint mechanics. Most feel that braces are best used as an adjunct to other therapies.⁵

Limitations

As with any case study, this report is the outcome of a single patient who may not respond to treatment the same way as other patients. The patient was a 26-year-old athlete, was in peak physical condition, and may have responded more quickly than the general public. Specific to this case, the patient was also a chiropractic student being treated at the chiropractic university he was attending; thus, his motivation or responses may have been influenced by his status as a student. It is also possible that he could have improved in spite of the care provided. Future prospective studies should be performed to determine the impact that chiropractic multimodal

treatment may have on postsurgical recovery for lower extremity injuries.

Conclusion

This case demonstrates that chiropractic care may provide rehabilitation of patients with postsurgical lateral release. A multimodal approach treating body biomechanics, focusing on the lower extremities, may help with the specific knee complaints and the factors that may lead to chronic patella dislocations. The dynamic treatment plan for this patient aimed to help him progress at a level comfortable and specific to his needs.

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